

955.049



PATENT SPECIFICATION

NO DRAWINGS

955.049

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Date of Application and filing Complete Specification: Sept. 13, 1962.
No. 34940/62.

Complete Specification Published: April 8, 1964.

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Index at acceptance:—C3 N(1B3, 3A2X, 3A3D, 3A3X, 3A4, 3B1A)

International Classification:—C 08 h, C 09 k, C 10 g

COMPLETE SPECIFICATION

Bituminous Sealing Composition

We, GULF STATES ASPHALT COMPANY INC., duly organised and existing under the laws of the State of Texas, United States America of 1522 Melrose Building, Houston 2, Texas, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to new and useful improvements in compositions, and particularly adhesive and sealing bituminous compositions.

An object of this invention is to provide a new and improved bituminous composition which has permanent or substantially permanent adhesive and sealing characteristic.

An important object of this invention is to provide a new and improved adhesive and sealing bituminous composition which is permanently or substantially permanently non-hardening and non-drying and therefore remains pliable and adhesive indefinitely so that a time delay between the time of applying the composition to surfaces to be joined and the contacting of the adhesive thereon does not affect the adhesive or its ability to bond and seal between such surfaces.

Another object of this invention is to provide a new and improved petroleum residual base composition which retains its adhesiveness even when applied or used in the presence of liquids such as water and alcohol so that such composition may be used for an adhesive and/or sealing such things as joints between pipes, asphalt sheets, boards on boats and many other items even though such items are completely immersed in water.

A further object of this invention is to provide a new and improved adhesive and sealing bituminous composition which has an abnormally high structural and cohesive strength immediately upon application as compared to known bituminous adhesives and

it retains its strength thereafter.

Still another object is to provide a bituminous material which is non-flowing at high temperatures and can be made non-flowing at temperatures of about 350°F. or more, and which is also permanently pliable and non-cracking even by impact at low temperatures such as sub-zero temperatures.

Still another object of this invention is to provide an adhesive and sealing bituminous composition which is permanently of substantially permanently non-shrinking, whereby such composition remains in full contact with the surfaces sealed therewith even after extended periods of time.

A particular object of this invention is to provide a new and improved bituminous composition which adheres to glass, metal, ceramics, concrete, cloth and many other materials and which material has many uses, one of which is as a sealing means between joints of concrete, ceramic or metal pipe such as sewer pipe.

According to the invention a composition having permanent sealing and adhesive properties comprises petroleum derived bitumen residual having a Saybolt-Furol viscosity at 210°F of from 50 to 250 seconds and an additive selected from the group consisting of finely ground inorganic silicates, vegetable fibres, mineral fibres, rice hulls, and mixtures thereof, said composition being substantially free of any volatile matter.

The invention will be apparent from the following description, which concerns, by way of example only, one form of composition embodying the invention.

The composition of this invention is extremely unusual in its characteristics and behaviour and it performs quite unexpectedly as compared to prior known compositions of this type. As will be more evident hereinafter, the composition of this invention has many uses because of its unusual characteristics or properties.

[Price 4s. 6d.]

Printed in Great Britain

5 The composition of this invention includes
a petroleum derived bitumen residual which
is the residual bitumen or product resulting
from the distillation of petroleum. Such bit-
men residual should have a Saybolt-Furol
viscosity at 210°F. of from 50 seconds to 250
seconds. Such residual should also have a
minimum flash point (Cleveland Open Cup)
of about 475°F. as determined by the ASTM
10 test D 92-56, and the specific gravity as
determined by ASTM test D 71-52 should
be between 0.95 and 1.04, with the preferred
range being 0.97 to 1.00. The preferred range
for the Saybolt-Furol viscosity at 210°F. is
15 from 100 seconds to 200 seconds. It will be
understood by those skilled in the art that
the Saybolt-Furol viscosity is determined by
the ASTM D88-44 procedure. It will also
be understood that the designation of
20 "ASTM" as used throughout this specifica-
tion identifies the American Society for Test-
ing Materials and the tests are those specified
by such group. The bitumen residual which
is used in the composition of this invention
25 should also have a low temperature suscepti-
bility factor. As is well known, the suscepti-
bility factor is calculated by dividing the
penetration of the asphalt or other material
at 77°F. by the penetration at 32°F. Such
30 penetrations are obtained by the standard
ASTM test designated D217-48. Using such
basis for calculating the susceptibility factor,
the bitumen residual in the composition of
this invention should have a susceptibility
35 factor not greater than 6 and preferably from
2 to 4. Also, the bitumen residual should be
adhesive rather than unctuous and that can be
determined readily by observation and con-
tact. In other words an adhesive residual will
40 tend to stick to the fingers when contacted by
the fingers but an unctuous residual will have

an oily feel and will not be adhesive or stick
to the fingers.

The composition of this invention includes
an additive which includes finely ground 45
material and/or fibrous material so that the
composition remains pliable or workable and
also sag-resistant at temperatures at least as
high as 300°F. There are a number of finely 50
ground materials and fibrous materials which
will serve as the additive or additives in the
composition. By way of example, the finely
ground material or materials may be benton- 55
ite, diatomaceous earth, colloidal clays, talc,
slate flour and silicates, each of which should
be fine enough to pass standard mesh screens
from 100 to 400 in size (U.S. Bureau of
Standards). Since the product of this inven-
tion has many uses and is often used in con- 60
junction with the sealing of pipe joints where
the composition is exposed to both acids and
alkalies, it is desirable, and in some cases
essential to provide a fibrous material such
as asbestos, Wollastonite or a magnesium sili- 65
cate which is chemically inert to the acid and
alkali reactions. However, fibrous materials
other than such acid and alkali resistant
materials may be employed. For example,
diatomaceous earth, ground vegetable or 70
mineral fibres, cotton linters, rice hulls, jute,
hemp, begasse and other known organic or
inorganic fibrous materials may be used.

It is important to note that the components
set forth above would not have a solvent
therewith, and no portion of the composition 75
is subject to evaporation or drying.

To illustrate the invention, the following
specific examples or embodiments of the com-
position of this invention are set forth, but
it is to be understood that such examples are 80
by way of illustration and are not to be
construed as limiting the invention.

Tests on Final Product :	Example I	Example II	Example III	Example IV
Specific Gravity ASTM D71-52	1.05	1.20	1.30	1.50
Wt./Gal. Specific Gravity x 8.33	8.75	10.00	10.83	12.49
Flash Point (COC) ASTM D92-56	475°F. minimum	475°F. minimum	475°F. minimum	475°F. minimum
Soft Point ASTM D36-26	150°F. minimum	300°F. minimum	320°F. minimum	350°F. minimum
Ductility @ 77°F ASTM D113-44	15 cm.	10 cm.	5 cm.	3 cm.
% Finely Ground and Fibrous Material by Weight AASHO T. 111-42	5%	30%	40%	55%
% Bitumen by Weight ASTM D4-52	95%	70%	60%	45%
Penetration Cone ASTM D217-48 @ 77°F. 5 sec. 200 gm. total	170	115	55	40
Penetration Cone ASTM D217-48 @ 32°F. 60 sec. 300 gm. total	210	160	140	115
Penetration Cone ASTM D217-48 @ 115°F. 5 sec. 150 gm. total	250	140	160	40

In the foregoing examples, the "ASTM" designations refer to the well known tests of the American Society for Testing Materials, as previously explained. The test for the percentage of the finely ground and/or fibrous material is an "AASHO" test and is also a well known test established by the American Association of State Highway Officials.

5 The percentage of the bitumen or bitumen residual in the composition may vary from 45% by weight to 95% by weight, the amount depending to some extent upon the particular application for the composition. The bitumen referred to in the foregoing examples is the petroleum derived bitumen residual described previously in this specification and should have the properties previously referred to herein.

10 The percentage of the additives, namely, finely ground material and the fibrous material, may vary between 5% by weight and 55% by weight, and generally such materials are present in a mixture with equal parts of each material. In each of the above

15 examples, the finely ground material was bentonite and the fibrous material was asbestos and they were present in equal amounts. Such materials are intimately mixed with the residual with standard mixing equipment. By way of further example, each of the foregoing examples may be varied by using as the additive all of one of the fibrous materials previously set forth or all of one of the finely

20 ground materials, or a mixture of any of such materials, in the various percentages set forth in the examples I to IV. In such instances,

the other properties of the materials in each of such examples would be the same.

As previously mentioned, the composition of this invention has many uses because of its unusual properties and characteristics. The material is pliable and is not subject to cracking even by impact at extremely low temperatures such as sub-zero temperatures, while at the same time, the material will resist a tendency to flow even at temperatures as high as 350°F. Such properties are reflected in the softening point and ductility tests and data set forth above with respect to each of the examples. Additionally, the non-shrinking, the non-hardening and the non-drying properties of the material are permanent, or substantially permanent, so that such properties will remain constant over a long period of years. Additionally, the composition or materials of this invention is permanently, or substantially permanently, adhesive and also it has permanent, or substantially permanent sealing characteristics. For that reason, the composition of this invention may be applied in a situation for serving to bond together surfaces or to seal same and may be left in that

condition for a long period of time without danger of the material becoming brittle or cracking or losing its bond. Additionally, the composition of this invention has water-
 5 proofing, insulating and sound proofing properties. Furthermore, the material of this invention retains its adhesiveness and sealing properties even when applied in the presence of liquids such as water or alcohol so that
 10 it may be applied to surfaces for bonding and sealing same even when such surfaces are immersed under water. The composition of this invention is therefore unusual and its properties are so unique that it opens an entire new area for the use of this type of
 15 composition. One of the principal uses for this invention is as a sealing adhesive joint composition between sections of pipe made of concrete, ceramic, steel, or other materials.
 20 This material readily conforms to the surfaces of the pipe joint which are to be adhered or sealed and it remains pliable so that even if there is a shifting of the sections of the pipe relative to each other the seal remains
 25 effective.

Other typical uses for this composition or material would be as a seal or bonding composition between asphalt sheets, particularly
 30 such sheets as are immersed in water or are subjected to moisture and water in use. Therefore, it is believed evident that the composition of this invention is a highly unusual material and that it has many uses which
 35 will occur to those skilled in the art.

It will be appreciated, that it is not intended to limit the invention to the above
 40 example only, many variations being possible such as might readily occur to one skilled in the art without departing from the scope thereof.

Thus, it will be appreciated that the advantages of the invention may be manifest when the various properties and quantities of the
 45 constituents of the composition differ slightly from the ranges stated hereinbefore, and the claims should be construed accordingly.

WHAT WE CLAIM IS:—

1. A composition having permanent sealing and adhesive properties, comprising petroleum
 50 derived bitumen residual having a Saybolt-Furol viscosity at 210°F of from 50 to 250 seconds, and an additive selected from the

group consisting of finely ground inorganic silicates, vegetable fibres, mineral fibres, rice hulls, and mixtures thereof, said composition
 55 being substantially free of any volatile matter.

2. A composition having permanent sealing and adhesive properties, comprising from 45% to 95% of petroleum derived bitumen residual having a Saybolt-Furol viscosity at 210°
 60 Fahrenheit of from 50 seconds to 250 seconds, and with essentially all of the remainder an additive selected from the group consisting of finely ground inorganic silicates, vegetable
 65 fibres, mineral fibres, rice hulls, and mixtures thereof.

3. The composition set forth in claim 2, wherein said silicates are finely divided so as to pass mesh screens from 100 to 400 in size.
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4. The composition set forth in claim 2, wherein said bitumen residual has adhesive characteristics, a specific gravity between 0.95 and 1.04, and a susceptibility factor not
 75 greater than 6.

5. A composition having permanent sealing and adhesive properties, comprising, from 45% to 95% of petroleum derived bitumen residual having a minimum flash point
 80 (C.O.C.) of 475° Fahrenheit and a Saybolt-Furol viscosity at 210° Fahrenheit of from 50 seconds to 250 seconds, and with the remainder consisting of substantially equal parts of bentonite and asbestos.

6. A composition having permanent sealing and adhesive properties, comprising, from 45% to 95% of petroleum derived bitumen residual having a minimum flash point
 85 (C.O.C.) of 475° Fahrenheit and a Saybolt-Furol viscosity at 210° Fahrenheit of from 50 seconds to 250 seconds, and with the remainder an additive selected from the group consisting of finely ground inorganic silicates, vegetable fibres, mineral fibres, rice hulls,
 90 and mixtures thereof.

7. A composition having permanent sealing and adhesive properties, substantially as described herein.
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